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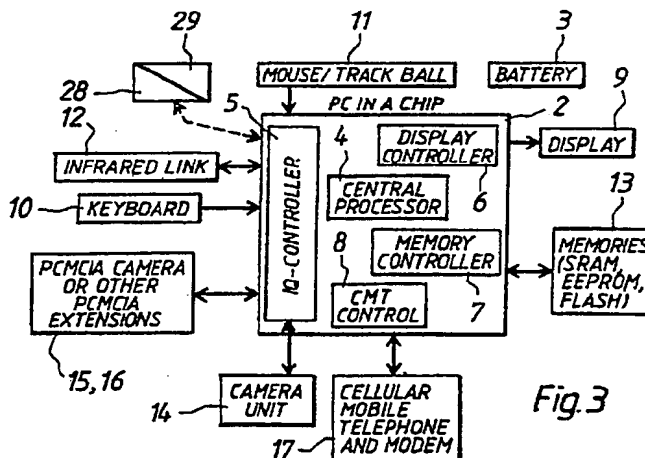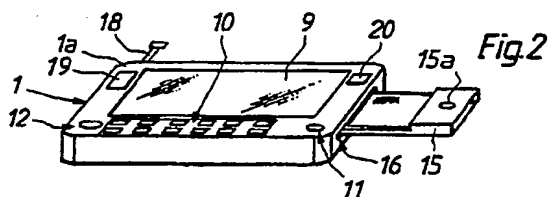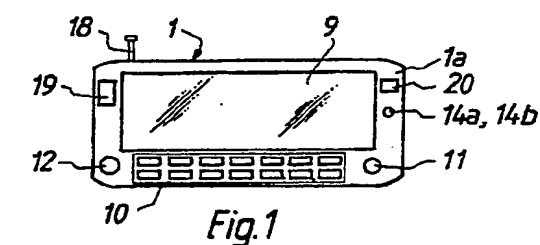UK CL (Edition N) G4A ADT AKS , H4K KFH , H4L
LECX
INT CL^6 G06F , H04M , H04Q
ONLINE : WPI

(54) Device for personal communications, data collection and data processing and a circuit card

(57) A device for personal communication, data collection and data processing, which is a small-sized, portable and hand-held work station comprising a data processing unit (2); a display (9); a user interface (10, 11); a number of peripheral device interfaces (12, 17); at least one memory unit (13); a power source, preferably a battery (3); and an application software; also comprises a camera unit (14). The camera unit (14) comprises a camera (14a), preferably a semiconductor camera, and optics (14b) connected thereto, which are placed in the housing (1) of the device. Alternatively, the camera unit (14) is fitted on a PCMCIA card (15) which can be connected to the PCMCIA card slot (16) of the device.

Fig.1

Fig.2

Fig.3

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Fig.1

Fig.2
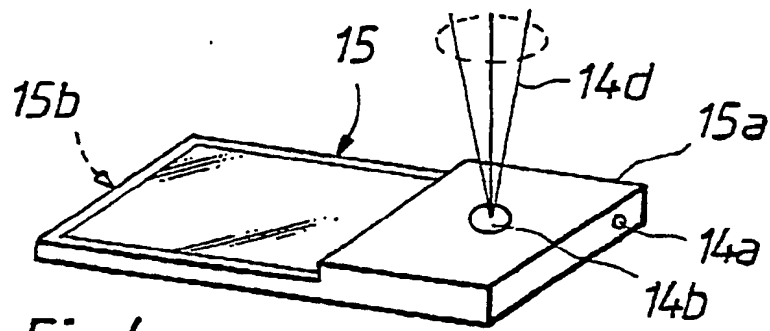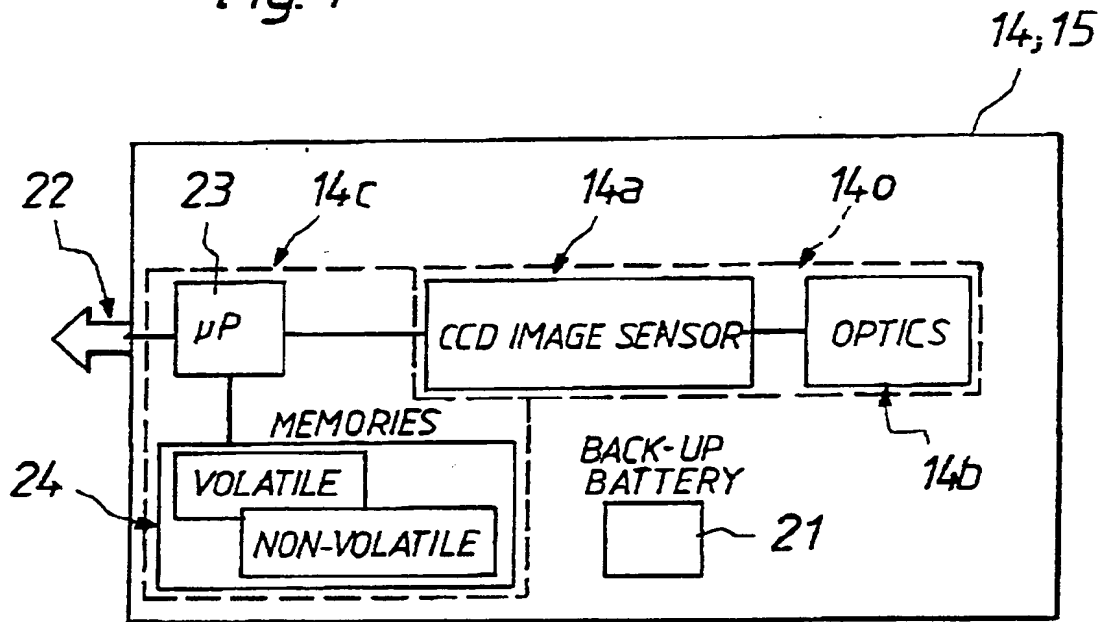
MOUSE/ TRACK BALL

BATTERY

PC IN A CHIP

DISPLAY CONTROLLER

DISPLAY

INFRARED LINK

IQ-CONTROLLER

CENTRAL PROCESSOR

KEYBOARD

MEMORY CONTROLLER

MEMORIES (SRAM, EEPROM, FLASH)

PCMCIA CAMERA OR OTHER PCMCIA EXTENSIONS
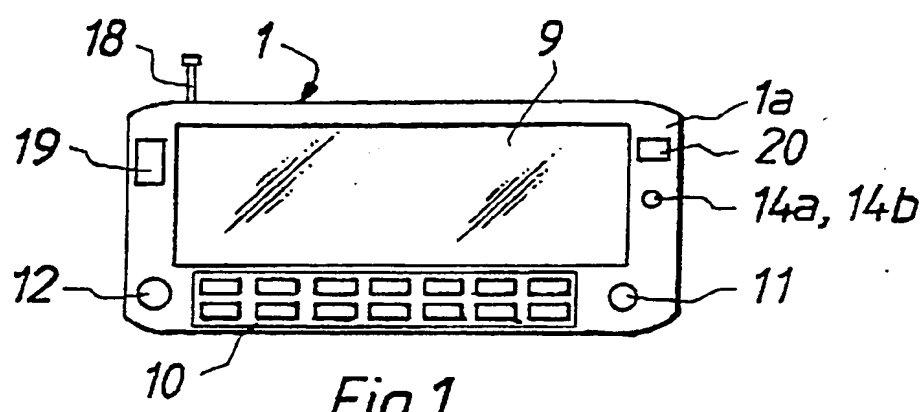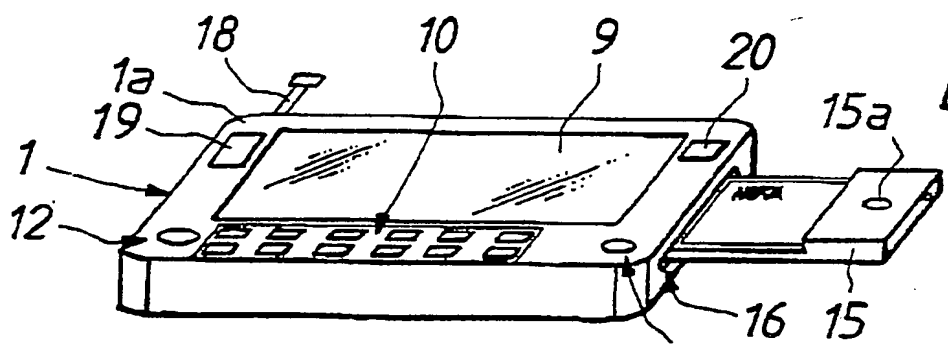
CMT CONTROL

CAMERA UNIT

CELLULAR MOBILE TELEPHONE AND MODEM

Fig.3

Fig. 4

Fig. 5

Fig. 6

Fig. 7

Fig. 8

Fig. 9

DEVICE FOR PERSONAL COMMUNICATIONS, DATA COLLECTION AND DATA PROCESSING, AND A CIRCUIT CARD

The object of the invention is a device according to the introductory part of Claim 1 for personal communication, data collection and data processing. The device consists of a small-sized housing comprising a data processing unit which contains a data processor with peripheral circuits and memory units, a display, a user interface, a number of peripheral device interfaces, a power source, preferably a battery, and application software.

Another object of the invention is a circuit card according to the introduction of Claim 8 which can be fitted to the card slot arranged in connection with a device intended for personal communication, data collection and processing, in particular.
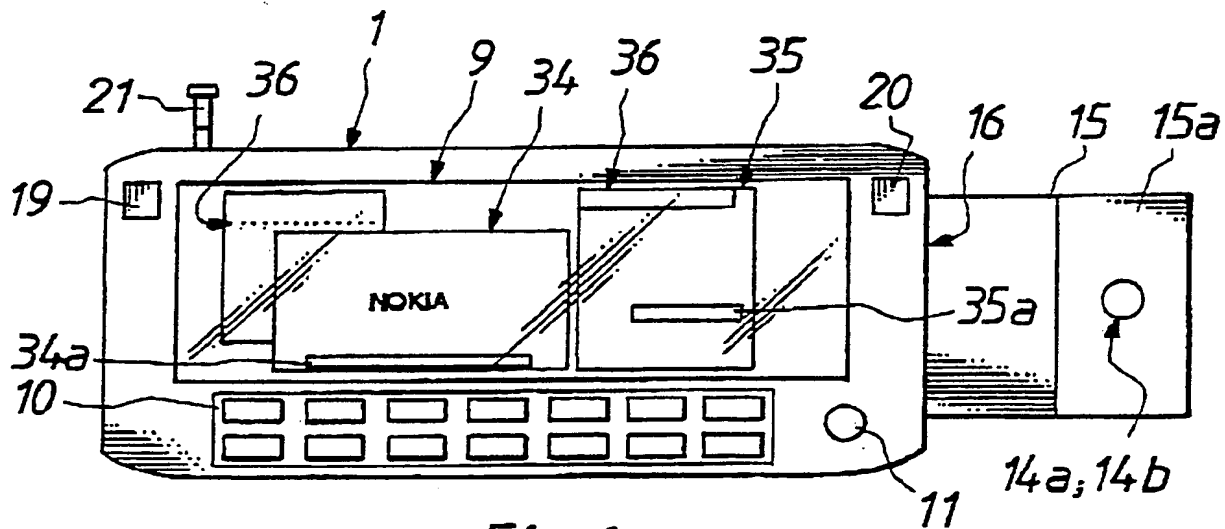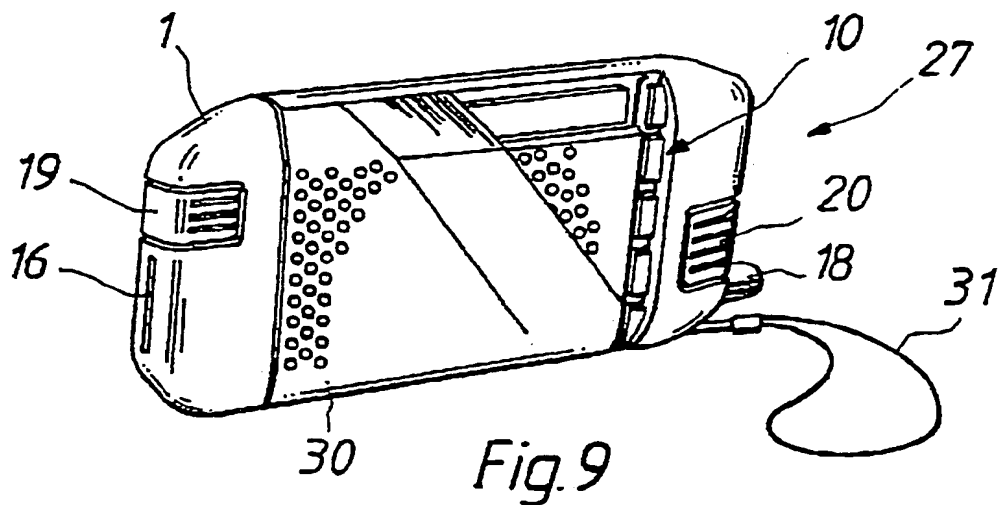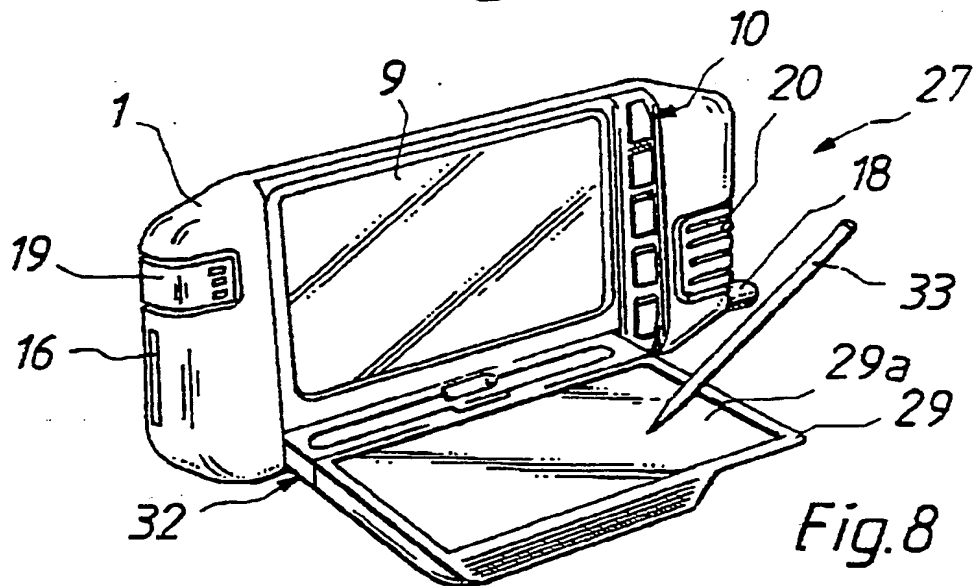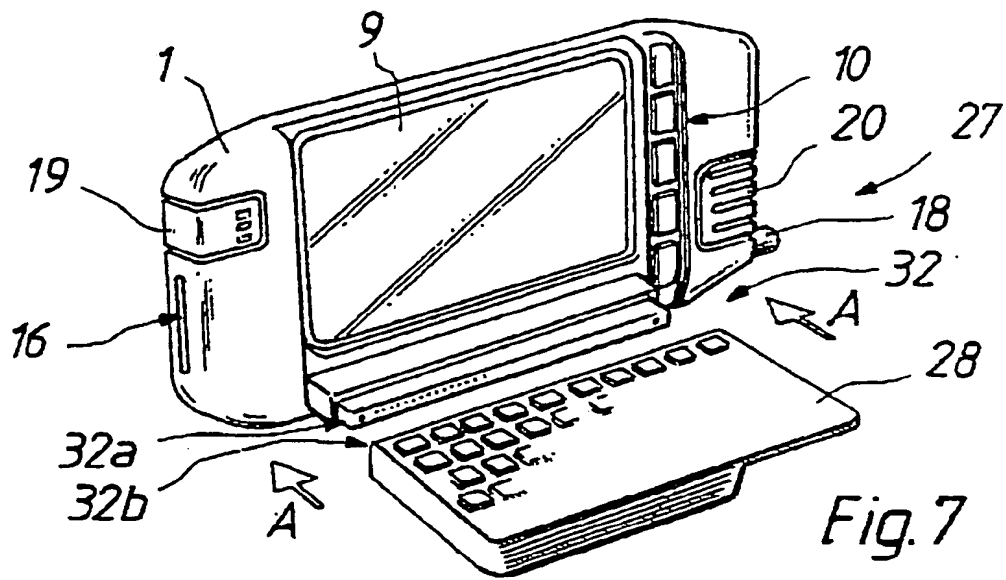
Personal communication devices and/or mobile organisers, such as notebook computers and the like, known from before, are small, light-weight, portable and hand-held or laptop workstations. A number of accessories and application programs which offer service functions can be installed in such personal devices, when necessary. A such notebook computer is disclosed in international patent application WO-93/14458.

The notebook computer can be equipped with an electronic scanner by means of which both text and figures can be read into the memory of the computer. This helps to eliminate the drawbacks of small keyboards, in particular. Data required in many connections, such as contact information included in business cards, can be read into the memory of the computer. However, electronic scanners comprise fine-mechanical parts which wear and may cause problems. Especially paper feeding arrangements fitted in small notebook computers are problematic.

The general purpose of this invention is to provide a new device for personal communication, data collection and processing which improves communication especially between a user and the device. A special purpose of the invention is to provide a device for personal communication, data collection and processing which makes it possible to collect data efficiently and to communicate with the environment. This is accomplished by the characteristic features of the invention, disclosed in appended Claims 1-7.

Another purpose of the invention is to provide a new interface card which makes it possible to improve the data collection systems of small microcomputers, in particular. This is accomplished by the characteristic features of the invention, disclosed in Claim 8.

An advantage of the invention is that one and the same device, personal communications, data collection and processing comprises an easy-to-use data collection device, efficient data processing equipment (programs) and data transmission equipment.

The invention is described in the following in more detail with reference to the appended drawings in which:

Figure 1 shows a device according to the invention for personal communication, data collection and processing, in which the data collection device is implemented by means of an integrated camera unit;

Figure 2 shows another device according to the invention for personal communication, data collection and processing, in which the data collection device is implemented by a camera unit arranged in a PCMCIA card;

Figure 3 shows a device for personal communication, data collection and processing, in the form of a block diagram;

Figure 4 shows a PCMCIA card, i.e., a PCMCIA camera card comprising a camera unit as an essential part thereof;

Figure 5 shows a block diagram of the camera unit;

Figure 6 shows a device according to the invention, whose display illustrates an example of an application related to the camera unit;

Figure 7 shows a device according to the invention for personal communication, data collection and processing, comprising a replaceable keyboard;

Figure 8 shows a device according to Figure 7, comprising a digitizer pad instead of the keyboard; and

Figure 9 shows the device of Figure 7 when closed.

Figures 1 and 2 show two application examples of the device according to the invention for personal communication, data collection and processing. A block diagram of such device is shown in general form in Figure 3. The device according to the invention is called a notebook computer in the following.

A notebook computer is a small, portable work station. The external dimensions of its housing 1 are preferably in the order of 170 mm x 85 mm x 30 mm (length x width x height) and the weight 1000 g at the most, preferably 800 g or less. The device is preferably arranged to operate by one or more batteries 3 (Figure 3) which are fitted replaceably inside housing 1.

The notebook computer comprises data processing unit 2 (Figure 3) which is preferably arranged on one semiconductor chip. Data processing unit 2 comprises processor 4 which is preferably a low power RISC processor. Data processing unit 2 further comprises input/output controller 5, display controller

6, memory controller 7 and cellular mobile phone controller 8. In addition, data processing unit 2 comprises connection buses and cables between different controllers and the data processor which are not separately shown in the block diagram of Figure 3.

The notebook computer further comprises display 9 which is arranged, in the application examples of Figures 1 and 2, fixedly in connection with housing 1 on large side 1a thereof which is essentially of a rectangular shape. Display 9 is provided, for example, by a liquid crystal display, the resolution of which is at least 640 x 200 pixels^2 and the dimensions in the order of 130 mm x 70 mm. Display 9 is connected to display controller 6.

The notebook computer also comprises keyboard 10 and/or mouse/track ball 11 as a user interface. Keyboard 10 and track ball 11 in this application are arranged fixedly to the notebook computer in the vicinity of display 9. The notebook computer preferably comprises infrared link 12 by means of which the connection with peripheral devices, such as a printer, another microcomputer or the like, is provided. Keyboard 10, mouse/track ball 11 and infrared link 12 are connected to input/output controller 5, as shown in Figure 3.

The notebook computer further comprises one or more memory units 13. The memory unit can be implemented by means of SRAM, EEPROM and/or FLASH memory circuits, for instance. The operating system and preferably at least part of the application programs are recorded in memory unit 13. In addition, memory unit 13 contains a sufficient amount of read-write memory space.

The notebook computer further comprises a data collection device which is implemented by means of a camera unit. The embodiment of Figure 1 represents camera unit 14 (Figure 3) fitted in housing 1 of the notebook computer as a stationary part thereof. In this application, camera 14a of camera unit 14 and related optics 14b are arranged on the same side of the housing as display 9, though a different disposition is also possible. Camera unit 14 is

connected via input/output controller 5 to data processing unit 2 (Figure 3).
Camera unit 14, which is represented in the form of a block diagram in Figure
5, consists of camera arrangement 140 which comprises camera 14a provided
with suitable optics 14b, and image processing unit 14c connected to the
camera arrangement. This data collection unit can be used to transfer data
presented on paper or the like as well as an image taken of the surroundings,
for instance of a person, to the notebook computer to be processed further.

In the notebook computer application of Figure 2 camera unit 14 is fitted in a
circuit card, preferably in PCMCIA card 15. Camera 14a and optics 14b of
camera arrangement 140 are integrated in this card 15 together with their
peripheral electronics, i.e., the image processing unit 14c (Figure 5). The circuit
card, i.e., camera card 15, in turn, can be fitted into the card slot, such as
PCMCIA card slot 16, of the mobile organiser. Camera 14a of the embodiment
of both Figure 1 and Figure 2 is implemented as a semiconductor camera,
preferably as a small CCD (Charge Coupled Device) camera. The adapter in
PCMCIA card slot 16 is connected to input/output controller 5, as illustrated in
Figure 3. It is obvious that other corresponding, applicable PCMCIA cards,
which meet the standards drawn up for card slots, can also be fitted into this
card slot 16.

The notebook computer further comprises a radiotelephone, i.e., cellular mobile
phone unit 17, preferably as an integrated part thereof. It is connected to
cellular mobile phone controller 8 of data processing unit 2 and to
receiver/transmitter antenna 18. In the case of a telephone set operating in an
analogue cellular network, a modem is preferably connected to cellular mobile
phone unit 17. Cellular mobile phone unit 17 is based on the standard cellular
mobile phone technology. Both data and speech can be transmitted via
integrated cellular mobile phone unit 17. The data transmission properties are
based on an analogue modem and the GSM data interface, for instance, the
technology of both of them being conventional. For a speech connection,
miniature speaker 19 and microphone 20 can be arranged in the housing of

notebook computer 1 on both sides of display 9. The notebook computer can then be used in the same way as a conventional hand-held telephone.

An additional part of the notebook computer is software applied for it. It is recorded in memory unit 13. Using the software, the user controls different functions of the mobile organiser as required. The functions related to the notebook computer include, for instance: telephone services which are based on the cellular mobile phone (data transmission and/or speech transmission properties), facsimile services, electronic mail, short message service/SMS, a calendar and scheduler software, a clock with alarm clock functions, camera functions to record images and paper documents, as well as computer, i.e., PC interface functions for transferring information to PC applications.

Camera unit 14 operating as the data collection device is considered more closely in the following. Camera 14a and optics 14b connected thereto are fitted to PCMCIA card 15 in the camera unit. The Personal Computer Memory Card International Association, i.e., the PCMCIA was formed in order to advance the exchangeability of integrated circuit cards in computers and other electronic devices. Consequently, the PCMCIA cards are standardised cards which are applicable for both memory cards and expansion cards of peripheral circuits, i.e., for input/output cards. Camera card 15 described herein is based on the standard mentioned above in which camera arrangement 140 and peripheral circuits required by it are integrated in the standard card. Figure 4 shows a physical model of a possible PCMCIA card 15 in which camera unit 14 is fitted in the thickened part 15a of the card. Camera 14a, such as a CCD (Charged Coupled Device) camera, is preferably a camera focused on a fixed distance and it is preferably fitted to the centre part of the enlargement 15a of the card. Camera 14a with its optics 14b is arranged so that the image field 14d of the camera opens up perpendicular to the surface of card 15. Adapters 15b are arranged at the other end of card 15 to connect the card to the PCMCIA card slot 16 in the notebook computer and to the counter connectors in the card slot.

In principle, the structure of both camera card 15 and camera unit 14 conforms to the block diagram shown in Figure 5. Camera card 15 consists of camera arrangement 140 which comprises camera 14a and optics 14b, image processing unit 14c, battery 21 and interface 22 to external systems which in this case is a standard PCMCIA interface concerning camera card 15. Image processing unit 14c comprises microprocessor 23 and a number of memory units 24. Optics 14b are provided by a suitable lens arrangement, by means of which a sharp image is obtained of the object to be scanned in on the image plane of camera 14a. Camera 14a is preferably implemented as a CCD camera comprising a two-dimensional light-sensitive CCD sensor, the resolution of which is from 250 k pixel as high as to 26.2 Mpixel. Memory units 24 preferably comprise two kinds of memory units: volatile memory units, such as DRAM and SRAM units used as scratch pad storages, and non-volatile memory units, such as FLASH and EPROM units which are used as base program memories. Power to the PCMCIA card is supplied via the PCMCIA interface from the notebook computer. Battery 21 is mainly used to ensure that images are maintained in the volatile memory units if the PCMCIA card is detached . from the card slot. Battery 21 can be also used for the same purpose in camera unit 14 (Figure 1) integrated in the notebook computer.

Camera unit 14 functions in the following way, whether it is fixedly integrated to the notebook computer or connectable to the card slot of the notebook computer as camera card 15: a picture of a document or three-dimensional environment taken by camera 14a through optics 14b is transferred to image processing unit 14c and through its microprocessor 23 to memory unit 24, such as RAM. When the user wishes to view the picture thus taken on display 9 of the notebook computer, he/she can do that immediately. The desired image information is read from memory unit 24 by means of microprocessor 23 of camera card 15, and the image information is transmitted to processor 4 of the mobile organiser along PCMCIA interface 22 or a corresponding interface and further to display 9 via display controller 6. Image processing unit 14c

processes the image information into a suitable form to be presented to the user by the mobile organiser.

The image information recorded in camera card 15 can be scanned in either by the mobile organiser or by another computer and/or device provided with a PCMCIA interface or the like. It is possible to edit the picture by an external computer and the modified picture can be recorded again in memory unit 24 of camera card 15. By virtue of battery 21, the operation of microprocessor 23 of image processing unit 14c and that of memory unit 24 is assured in all circumstances.

Camera unit 14 comprises a character recognition software which is similar to that used in computers provided with pen interfaces, for instance. Previously known pattern recognition software can be used to recognise graphical objects. After a text and/or an image has been scanned in the notebook computer, the user can start an application program to process the data to suit his/her purposes.

The application program of camera unit 14 functions, e.g., in the following way: business card handler application 36 (Figure 6) is selected for the application program. The user first scans in the business card by camera 14a, then the picture of the business card and the information contained in it are transferred from camera unit 14 to memory unit 13 of the notebook computer and via data processing unit 2 to display 9. After the scanned image 34 of the business card is visible on display 9, the user opens business card handler application 36 and key fields 35 of this application appear on display 9, as illustrated in Figure 6. Key fields 35 have been recorded in the database. The user selects a suitable field 34a from the business card and drops it to the correct key field 35a of the business card handler application. The selection and dropping are made by means of the mouse or track ball 11. The fields required are selected from picture 34 of the business card and dropped to corresponding fields 35 of business card handler application 36. After the above-described

procedures have been carried out, the information contained in the business card can be used as address directory for letters, as telephone memo information or for other suitable purposes.

Other kinds of information can also be scanned in the notebook computer by means of camera unit 14. The document can be a note written on a paper by hand, for instance. The user scans in the document, stores it in the memory unit of the notebook computer and processes it as required. A graphics handler software can be arranged to function with camera unit 14. It can function in the following manner: the user draws a graphical object, such as a circle or a line, on a paper. The images are scanned in by camera 14a to memory unit 13 of the notebook computer and the user starts the graphics handler software using the keyboard or the mouse. The scanned picture of the graphical object is then shown on the display. The user can select a picture on the display and modify the object by means of the graphics handler application to look like a desired object, such as a regular circle.

The user can also select the character recognition software after the picture on the paper is scanned in the notebook computer by camera unit 14. The character recognition software converts the hand written text into ASCII characters. Indistinct characters are guessed by the software or the user is asked for further information.

The simplest alternative is to store the information scanned in memory unit 13 of the mobile organiser by camera unit 14, in the form of a bitmap. This type of image information is used in facsimile/telefax transmission. The same kind of image storing can also be used for storing incoming telefax messages.

The telefax functions can be implemented in the following way: the user writes notes on a paper and the characters on the paper are scanned in memory unit 13 of the notebook computer by camera unit 14. The user selects the telefax application from the application programs and defines a receiver for the message. Next the picture of the notes is transmitted as a bitmap and a telefax

message from the mobile organiser's memory unit via cellular mobile phone unit 17 comprising a telefax modem. Incoming telefax messages are received in a corresponding manner via cellular mobile phone 17 and stored in the mobile organiser's memory as bitmaps. After the picture is ready, it is output on display 9 of the mobile organiser by means of the telefax program. All the images stored in the mobile organiser's memory can be viewed on the display using an operating program which applies the said bitmap.

When a user interface based on camera unit 14 is integrated in connection with the notebook computer and especially its housing 1, obvious advantages are accomplished. With such camera unit 14 the user can scan different written and/or drawn information into the memory of the notebook computer quickly and easily. The use of camera unit 14 is faster and easier than writing with a pen, for instance. Information on business cards, as already mentioned, printed material and hand written notes, etc., can be scanned into the memory of the notebook computer by using camera unit 14.

Figures 7 and 8 show a notebook computer 27 according to the invention, in which keyboard 28 for writing texts and digitizer pad 29 can be installed replaceably. Figure 9 shows the notebook computer according to Figures 7 and 8 in which keyboard/digitizer pad 30 is turned against the display of the notebook computer and locked in its place. In this way it is easy to carry notebook computer 27 along and to even put it in the pocket. Alternatively, the notebook computer can be carried by wrist strap 31.

Notebook computer 27 comprises essentially the same parts and units as shown above in the embodiments according to Figures 1 or 2. Consequently, the parts of notebook computer 27 which are visible externally include housing 1, display 9, keyboard 10, miniature speaker 19 and microphone 20 as well as antenna 18 (cf. Figures 1 and 2 and the block diagram in Figure 3).

The external keyboard 28 of notebook computer 27 is used for writing. In spite of the small size, keyboard 28 comprises all the necessary characters, such as letters, numbers and a number of function keys. An advantage of such normal, external keyboard 28 is that the user is familiar with the keyboard itself and he/she can use it in a conventional way for writing and feeding texts to the notebook computer.

External keyboard 28 is connected to notebook computer 27 by means of connector 32. In the case of Figures 7 and 8, the male part 32a of connector 32 is in connection with housing 1 of the notebook computer, while the female connector part 32b is in connection with external keyboard 28. In addition, male part 32a of connector 32 is hinged to the lower part of display 9 or to the elongated side of housing 1, whereby it can be turned up by at least 90° with respect to the surface of the display so that the keyboard can be turned up to cover display 9, as shown in Figure 9, for instance. The female connector parts 32b of keyboard 28 are pushed to male connector parts 32a in the direction of arrows A, as shown in Figure 7, when the external keyboard is connected to notebook computer 27. Keyboard 28 is automatically connected to input/output controller 5 of notebook computer 27 and to data processing unit 2 (cf. Figure 3).

Digitizer pad 29 can be used advantageously instead of the above-described keyboard 28 in connection with notebook computer 27, as illustrated in Figure 8. A similar connector part 32b to that of external keyboard 28 is connected to digitizer pad 29, whereby digitizer pad 29 can be installed directly in place of external keyboard 28 in a corresponding manner, when external keyboard 28 is removed.

Digitizer pad 29 is based on a known technique. The user can write texts or draw figures on viewing screen 29a in the digitizer pad using pen 33, and digitizer pad 29 recognises the touch of pen 33 simultaneously and converts the drawn figure into a bitmap. The bitmap is shown on viewing screen 29a of

the digitizer pad until the user accepts it. After this the accepted digitised image is to be displayed on display 9 of notebook computer 27. The functions of digitizer pad 29 include an erase function of the drawn figure, which can be implemented in a known manner in various ways. For instance, digitizer pad 29 can include a function key by means of which the mode of digitizer pad 29 can be converted from the drawing mode into the erase mode and back again. In the drawing mode, figures can be drawn on viewing screen 29a of the digitizer pad, while in the erase mode these figures can be removed in a desired way.

An advantage of digitizer pad 29 is that texts or figures can be written or drawn on it almost in the same way as on a piece of paper. It is easy to edit the drawn figures or texts into an appropriate form using the application programs included in notebook computer 27.

A text or a figure written or drawn on digitizer pad 29 of notebook computer 27 can be stored later as an image in memory unit 13 of the notebook computer or fed to the character/object recognition software for further processing. Hand written texts can be converted into ASCII texts by the character recognition software, and graphical characters can be converted easily in the same way as is done by the recognition software. The operating modes of these software are described above in connection with the camera unit.

The bitmap images or converted ASCII texts/graphics transferred to the memory from digitizer pad 29 of notebook computer 27 can be later forwarded via telefax or electronic mail services, as disclosed above in the description of the invention. The files stored in the memory of notebook computer 27 can also be edited by means of external keyboard 28 and/or digitizer pad 29.

The notebook computer according to the invention comprises a number of facilities and/or application programs, by means of which the possibilities of the notebook computer can be utilised effectively. Such tools include, for instance: electronic calendar, phone list and note pad, fully integrated with each other

and to the communications, data collection and data processing functions of the notebook computer. The services used most frequently include functions related to speech communications, telefax function, electronic mail, paging, data bank services and on-line information service connections. When transmitting electronic mail or telefax messages, the user can digitise the message on the display of the notebook computer and to simply select the recipient information from the phone list. The phone list is generally an application which offers an easy way to select the address information of the recipient for a chosen electronic contact as well as for a possible written letter. The user can input address information and telephone number information of different people in the memory of the notebook computer by means of the camera unit functioning as the data collection device and by means of suitable utility functions related to the camera unit. The address file may include different additional information, such as a telephone number, telefax number, e-mail address as well as other necessary information, in addition to the name and address. It depends on the application selected for the notebook computer, which information the user chooses from the phone list and connects to the message to be transmitted.

When cellular mobile phone unit 17 of the notebook computer and the related cellular mobile phone controller 8 are implemented as a digital GSM system, the user can transmit SMS messages (Short Message Service). The user writes the message to the notebook computer using the keyboard or a pen on the digitizer pad, or the message reading is read by the data collection device such as camera unit 14. After the message has been transmitted via a cellular mobile phone to a GSM short message centre, it is forwarded to the recipient. The recipient is chosen from the phone list or the user inputs it manually.

An electronic mail message is implemented in the same way as the SMS message above, but the electronic mail message may be longer.

A device in accordance with the invention may also be a radiotelephone comprising a microprocessor, a display, a user interface, a microphone, a speaker, and a camera unit.

It is possible to place other cards according to the PCMCIA standard into the PCMCIA card slot of the notebook computer. For instance, a hard disc, an additional memory and a PCMCIA radio module are viable. The PCMCIA radio module provides a possibility to use the notebook computer in all cellular mobile phone systems. In this case, only an appropriate radio module card is installed in the PCMCIA card slot.

The notebook computer can communicate with another personal computer via a serial and/or parallel port or via a PCMCIA interface. The interface between the notebook computer and another computer can be implemented by means of an infrared link or a cable connection. Infrared link 12 can be used for communication between the notebook computer and a PC or other peripheral devices. For instance, the writing of a file can be implemented so that the file is transferred to the printer by means of the infrared link and then printed.

The invention is described above with reference to some preferred embodiments thereof, but it is obvious that the invention can be modified in various ways within the inventive idea defined by the appended Claims.

CLAIMS

1.   A device for personal communication, data collection and data processing, which is a small-sized, portable and hand-held work station comprising a data processing unit (2); a display (9); a user interface (10, 11); a number of peripheral device interfaces (12, 17); at least one memory unit (13); a power source, preferably a battery (3); and an application software, **characterised** in that the device also comprises a camera unit (14).

2.   A device according to Claim 1, **characterised** in that the camera unit (14) comprises a camera (14a), preferably a semiconductor camera, and optics (14b) connected thereto, which are placed in the housing (1) of the device.

3.   A device according to Claim 1, **characterised** in that the camera unit (14) comprises a camera (14a), preferably a semiconductor camera, and optics (14b) connected thereto, which are fitted on a circuit card, preferably a PCMCIA card (15) which can be connected to the card slot, such as a PCMCIA card slot (16), of the device.

4.   A device according to Claim 2 or 3, **characterised** in that the device also comprises a cellular mobile phone unit (17).

5.   A device according to Claim 4, **characterised** in that the equipment required by speech communications, such as a microphone (20) and a speaker (19), contained in the cellular mobile phone unit (17), are fitted in the housing (1) of the device.

6.   A device according to any of the preceding Claims, **characterised** in that the device comprises a replaceable keyboard (28) and a digitizer pad (29).

7.   A device according to any of the preceding Claims, **characterised** in that the device comprises an infrared link (12) for data transmission between external devices and the device.

8.   A circuit card, preferably a PCMCIA card which can be fitted to a card slot, such as a PCMCIA card slot, arranged in connection with a device intended for personal communication, data collection and data processing in particular, **characterised** in that a camera unit (14) is fitted on a circuit card (15), comprising a camera (14a), preferably a semiconductor camera, and optics (14b) connected thereto, and an image processing unit (14c).

9.   A portable radiotelephone comprising a solid-state camera unit, a user interface, a display for presenting information received by the camera, and a microprocessor adapted to control the operations of the camera and to process information received from the camera.

Patents Act 1977	Application number
'Exai er's report to the Comptroller under Section 17 (The Search report)	GB 9509961.0

Relevant Technical Fields	Search Examiner M J DAVIS
(i) UK Cl (Ed.N) G4A (AKS, ADT), H4L (LECX), H4K (KFH)	
(ii) Int Cl (Ed.6) G06F, H04Q, H04M	Date of completion of Search 28 JUNE 1995
Databases (see below) (i) UK Patent Office collections of GB, EP, WO and US patent specifications. (ii) ONLINE: WPI	Documents considered relevant following a search in respect of Claims :- 1-7

Categories of documents

X: Document indicating lack of novelty or of inventive step.

Y: Document indicating lack of inventive step if combined with one or more other documents of the same category.

A: Document indicating technological background and/or state of the art.

P: Document published on or after the declared priority date but before the filing date of the present application.

E: Patent document published on or after, but with priority date earlier than, the filing date of the present application.

&: Member of the same patent family; corresponding document.

Category	Identity of document and relevant passages	Relevant to claim(s)
A	EP 0526802 A2 (ALCATEL) whole document	

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